

On the Classification of Birds, and particularly of the Genera of European Birds. By JOHN HOGG, Esq., M.A., F.R.S., F.L.S., &c. Communicated by the Author.

The principal part of this paper was originally incorporated in my "Catalogue of *Birds*, observed in South-Eastern Durham, and in North-Western Cleveland," which I read before the zoological section of the British Association for the advancement of Science, at York, on the 26th September 1844; but, being desirous of extending the classification therein proposed, I thought it advisable to delay the publication of this part, until another opportunity had permitted me to examine the noble collection of birds in the British Museum, for the purpose of rendering it as perfect as my leisure would allow. That catalogue, exclusive of any remarks on arrangement, has already appeared in the "Zoologist" for August, October, November, and December, 1845. Now, with regard to the classification adopted for the same catalogue, and of which a sketch is published in the "Report of the fourteenth meeting of the British Association," it is here necessary to enter into some short explanation.

On forming that catalogue, I, in a great degree, followed *Mr Yarrell's* arrangement and nomenclature. Although I principally adopted the former, with certain exceptions, for the *land-birds*; yet, for the *water-birds*, I made considerable alterations, and chiefly assumed *Cuvier's* classification. Having twenty years ago written a "catalogue of most of the birds which are known to frequent the country near Stockton," that was afterwards published in the appendix to *Brewster's* "History of Stockton-upon-Tees," I chose for it the *Cuvierian* system, which had then been given to the world only seven years before in the *first* edition of the "Règne Animal." Being still much prejudiced in favour of that natural arrangement (which I believe I was one of the first to adopt in this country), it appeared to me to be more advisable to incorporate it in my recent Memoir with that classification subsequently instituted by some of our English

ornithologists,—making, at the same time, certain modifications in both,—than to use the latter alone, as *Mr Yarrell* had done. For, I must confess that it struck me as very anomalous to select *Cuvier's* Dentirostres, Conirostres, and Fissirostres, and then to reject, without any sufficient reason, the equally natural groups of his Longirostres, Cultriostres, Lamellirostres, &c., as those distinguished authors thought proper to do. Also, I introduced three families, namely, Upupidæ, Rccurvirostridæ, and Procellariadæ, from the “New Systematic Arrangement of Vertebrated Animals,” by *C. L. Bonaparte* (the Prince of *Musignano*, now of *Canino*), published in the Transactions of the Linnean Society, vol. xviii., 1840.

There are likewise several new tribes that I myself characterised from variations in the structure or form of the *bill*, and so tending to complete, in the steps of *Linnaeus*, a Rostral classification. And it seemed to me quite clear, that not only such was the view of the illustrious Swede, as a reference to the “*Systema Naturæ*” will shew; but, also, that the *bill* generally presents the most obvious and natural characters for the chief arrangement of birds. Thus, in continuance of this plan, and in its extension to the *genera* of the birds which have been discovered in *Europe*, I have uniformly taken the characters of all the *tribes* from those of the *bill*; whilst those of the *feet* and *toes* present the distinctions of the subclasses, of the orders, and likewise of many of the subtribes. Further and more careful examinations of certain birds have induced me to make some alterations in my classification, as published in the beforementioned report of the British Association, and my “*Catalogue of Birds, observed in South-Eastern Durham, and in North-Western Cleveland; with an appendix, containing the classification and nomenclature of all the species included therein.*” London, 1845.

Moreover, I have omitted to give the *subfamilies*, because I am at present inclined to consider them as superfluous, and as unnecessarily lengthening the classification; but those ornithologists who differ from me, can readily insert them in their proper places. I have paid some attention to the

selection of the genera, and have been obliged, in order to do away with the inconvenience of *subgenera*, to increase the number of the *genera* themselves; although I trust this has only been done where real and sufficient differences have confirmed such a necessity. But I must observe that a great many of the new genera, constituted by Messrs *C. L. Bonaparte* and *G. R. Gray*, appear to be unnecessary, and depending on far too minute distinctions. The former author, in his "Geographical and Comparative List of the Birds of Europe and North America," Edit. 1838, makes the genera then found in Europe to amount to the vast number of 246; but, in his later Memoir, "Catalogo Metodico degli Uccelli Europei," published in the "Nuovi Annali delle Scienze Naturali di Bologna, Anno 1842," he has injudiciously increased this number to 265. *Mr Gould*, in his splendid work on the "Birds of Europe," gives only 168 genera; whilst *M. Temminck* in his *second* edition, with the supplementary parts, of "Manuel d'Ornithologie," comprises all the European species in 97 genera; and 113 are the total number of genera mentioned in *M. H. Schlegel's* "Revue Critique des Oiseaux d'Europe." *Leide*, 1844.

Now, the entire number of genera, as selected by myself, for the birds of Europe, will be seen to be 205. Again, the Prince of *Canino*, in addition to his immense number of genera, has included in his very recent "Methodical Catalogue," many *subgenera*; to the latter, in truth, I cannot help expressing an insuperable objection, because by a frequent introduction of *subgenera*, a universal departure from the vast utility experienced in the *Binomial* method would soon take place, and which, in time, would most assuredly be followed by the intrusion of *subspecies* (as has already been effected by *M. Brehm*), and even of *subvarieties*.

In the classification of birds, the maxim—" *Exceptio probat regulam*," certainly prevails to a great extent; for there is scarcely a division, a tribe, or a family, in which some bird does not occur that departs from the *regular* or normal form of that division, and becomes in one or more of its characters an *exception* to, or assumes some *irregularity*, or wandering from the rest, and so constitutes what is usually termed

an “*aberrant*” form. Hence arises the especial difficulty of classifying birds with such correctness and minute accuracy, as every careful ornithologist would desire to do. So then, in my present arrangement, I earnestly hope that the zoologist, after making due allowance for certain *exceptions* or *aberrant* forms, will find the general divisions and leading characters of the tribes, subtribes, and other sections, not hastily designed, but uniformly carried out with a sufficient degree of exactness and regularity for all practical purposes, and in strict conformity with Nature.

The following is a *Synopsis* of my classification :—

CLASS II.—AVES.

SUBCLASS I.—AVES CONSTRIC-
TIPEDES.

DIVISION I.—TERRESTRES.

ORDER I. RAPTORES.

Tribe I. Planiceriostres.

Subtribe 1. Diurni.

Family 1. Sarcoramphidæ.

Genus. Neophron.

Family 2. Vulturidæ.

*Genera. Gyps, Vultur.**

Family 3. Gypaëtidæ.

Genus Gypaëtus.

Family 4. Aquilidæ.

Genera. Haliæetus, Aquila, Pandion, Circæetus.

Family 5. Falconidæ.

Genera. Falco, Accipiter, Astur, Milvus, Nauclerus, Elanus.

Family 6. Buteonidæ.

Genera. Buteo, Pernis, Circus, Strigiceps.

Tribe II. Tecticeriostres.

Subtribe 2. Nocturni.

Family 1. Strigidæ.

Genera. Surnia, Nyctea, Strix, Ulula, Surnium, Athene.

Family 2. Bubonidæ.

Genera. Bubo, Otus, Scops.

ORDER II. *Prehensores.*

Tribe. Rotundirostres.

Subtribe 1. Lævilingues.

Families 1. Plectolophidæ. 2.

Psittacidæ. 3. Macroceridæ.

4. Pezoporidæ. 5. Psittaculidæ.

Subtribe 2. Hirtilingues.

Family 6. Loriadæ.

Subtribe 3. Tubilingues.

Family 7. Microglossidæ.

ORDER III. *Inseesores.*

Tribe I. Curvirostres.

Subtribe 1. Scansores.

Family. Cuculidæ.

Genera. Cuculus, Oxylophus, Coccyzus.

Tribe II. Cuneirostres.

Family 1. Picidæ.

Genera. Dryotomus, Picus, Jynx.

Family 2. Apternidæ

Genus. Apternus.

Family 3. Sittidæ.

Genus Sitta.

Tribe III. Conirostres.

Subtribe 2. Clamatores.

Family 1. Coraciadidæ.

Genus. Coracias.

Family 2. Corvidæ.

Genera. Garrulus, Pica, Nucifraga, Corvus, Pyrrhocorax, Fregilus.

Subtribe 3. Cantatores.

Family 3. Sturnidæ.

Genera. Sturnus, Pastor, Agelaius.

* The Order and Genera in italics signify the *Extra-Britannic* Birds, or those which are *foreign* to the British Islands.

- Genus. *Phanicopterus*.
 Tribe IV. Spathulirostres.
 Family. Plataleidæ.
 Genus. Platalea.
 Tribe V. Longirostres.
 Family 1. Tantalidæ.
 Genera. *Tantalus*, *Ibis*.
 Family 2. Recurvirostridæ.
 Genus. *Recurvirostra*
 Family 3. Numeniadæ.
 Genera. *Terekia*, *Limosa*,
Numenius.
 Family 4. Scolopacidæ.
 Genera. *Totanus*, *Machetes*, *Rus-*
ticola, *Scolopax*, *Macrorham-*
phus, *Erolia*, *Tringa*.
 Family 5. Phalaropodidæ.
 Genera. *Phalaropus*, *Lobipes*.
 Family 6. Calidridæ.
 Genera. *Himantopus*, *Calidris*.
 Tribe VI. Diversirostres.
 Subtribe 3. Macroductyli.
 Family. Rallidæ.
 Genera. *Rallus*, *Crex*, *Zapornia*.
 Tribe VII. Frontiscutirostres.
 Family Fulicidæ.
 Genera. *Gallinula*, *Porphyrio*,
Fulica.
 ORDER VI. NATATORES.
 Tribe I. Lamellirostres.
 Subtribe 1. Simplicipollices.
 Family 1. Anseridæ.
 Genera. *Bernicla*, *Anser*, *Chen.*,
Cygnus, *Olor*, *Plectropterus*,
Chenalopex.
 Family 2. Anatidæ.
 Genera. *Tadorna*, *Cairina*, *Rhyn-*
chaspis, *Chauliodus*, *Dafila*,
Anas, *Mareca*.
 Subtribe 2. Membranipollices.

- Family 3. Fuligulidæ.
 Genera. *Clangula*, *Undina*,
Harelda, *Fuligula*, *Ædemia*,
Somateria.
 Tribe II. Serrirostres.
 Family 1. Mergidæ.
 Genera. *Mergus*, *Merganser*.
 Subtribe 3. Totipalmæ.
 Family 2. Fregatidæ.
 Genus *Fregata*.
 Family 3. Carbonidæ.
 Genera. *Carbo*, *Sula*.
 Tribe III. Sacculirostres.
 Family Pelecanidæ.
 Genus *Pelecanus*.
 Tribe IV. Tubinariostres.
 Subtribe 4. Longipennes.
 Family. Procellariadæ.
 Genera. *Diomedea*, *Procellaria*,
Puffinus, *Thalassidroma*.
 Tribe V. Medionariostres.
 Family. Laridæ.
 Genera. *Cataracta*, *Lestris*, *Larus*,
Rissa, *Xema*.
 Tribe VI. Subulirostres.
 Family. Sternidæ.
 Genera. *Anous*, *Viralva*, *Pon-*
tochelidon, *Sterna*.
 Tribe VII. Cuspidoirostres.
 Subtribe 5. Brevipennes.
 Family 1. Podicipidæ.
 Genus. *Podiceps*.
 Family 2. Colymbidæ.
 Genera. *Colymbus*, *Uria*.
 Tribe VIII. Sulcirostris.
 Family 1. Mormonidæ.
 Genera. *Mergulus*, *Mormon*,
Utamania.
 Subtribe 6. Imperfectipennes.
 Family 2. Alcidiæ.
 Genus. *Alca*.

It now becomes me to explain, as briefly and as clearly as I can, the subclasses, certain of the tribes, and other groups, adopted in the preceding classification.

Subclass I. Aves Constrictipedes,—Birds whose feet are constrictile, or adapted to grasping. The birds belonging to this subclass make, in general, compact and well built nests, wherein they bring up their very weak, blind, and mostly naked, young, which they feed with care, by bringing food

to them for many days, until they are fledged and sufficiently strong to leave the nest. They are principally monogamous, and have the feet endued with great *constrictility*, or complete power of grasping; and the thumb or hind-toe, which almost always exists, entirely rests upon the ground, and is in the same plane with the other, or fore toes.

The Order I. *Raptores*, I have distinguished by *two* tribes, *viz.*, 1st, *Planicerirostres*; and, 2d, *Tecticerirostres*. The *first* comprehends those genera which possess the *cere* of the bill *plain*, or conspicuous, and it is in general large, indeed often very extensive. But in the present *rostral* classification, the birds of prey might form a natural tribe,—*Aduncirostres*, on account of their strong and *hooked beak*, as in the words of Pliny—“*rostra—rapto viventibus adunca.*” Still I must add, that I much prefer the two first mentioned tribes, derived from the important characters of the *cere*.

Family 1. *Sarcoramphidæ*;—considering the *power of flight* as the chief characteristic of birds, I would commence this class by the *condor*. That magnificent monarch of the feathered race is, I believe, the largest of those species that are endued with the strongest, the most extended, and perfect wings; and it also possesses the power of flying in the highest degree. And I would terminate this class by the wingless auk (*Alca impennis*), and the penguins (*Spheniscidæ*), because these remarkable birds do not at all possess the faculty of flying, and have wings which are only rudimentary, or very imperfectly formed. The *condor* receives its generic title of *Sarcoramphus*, or *flesh-bill*, from the large *fleshy cere*, or skin with which its bill is so conspicuously furnished.

Subtribe 2. *Nocturni*:—the nocturnal birds of prey come under my *second* tribe—*Tecticerirostres*, or those raptores which have the *cere* of their bill *hid*, or covered with feathers: *Linnæus* erroneously characterised owls as possessing, “*rostrum aduncum (absque cerâ).*” So Dr *Fleming* says, the bill of owls is “*without cere,*” and the Prince of *Canino* describes them with “*cera obsoleta.*” On the contrary, in the genus *Otus*, the *cere* is *large*; although in all the genera

that singular wax-like membrane, situate at the base of the bill, is *concealed* by feathers.

Instead of resuming for the owls the two subdivisions of Linnæus, *Auriculatæ* and *Inauriculatæ*, I have arranged them into two families. — 1. *Strigidæ*, corresponding with the latter, or *without earets*; and, 2. *Bubonidæ*, that agrees with the former, and comprises those owls which are furnished *with earets*; or, as our old writers named them, *ears* and *horns*. Both of these families will have to be divided into *operculati* and *inoperculati*, with reference to the presence and absence of *opercula*, in the ears. The diurnal birds of prey approach the owls by the genera *Circus* and *Strigiceps*; the latter, or the *owl-harrier*, in the form of the head and the facial disc, comes most nearly to an owl. So, the family of *Strigidæ* approximates to the hawks or falcons, by the genus *Surnia*, of which the species called the *hawk-owl* (*Surnia funerea*), ought to be placed, the *first* in the distribution of the nocturnal raptores.

Order II. *Prehensores*:—This, with the preceding, and the following orders, constitute *six* in all, in my *general* classification of birds. I was indeed desirous of retaining only *five* orders, according to the system mostly used in England; but, on mature consideration, I found that I could not do so, if I attempted to follow an arrangement in accordance with *nature*: I have, therefore, been unwillingly compelled to place the *parrot* groups in a separate order, and which I have termed “*Prehensores*,” after M. *Blainville* and the Prince of *Canino*. But I have ventured to differ from some of the views of the last-named admirable ornithologist, and of M. *Illiger*, in making it my *second* order; and, in fact, the link which connects the *Raptores*, or birds of prey, with the true *Insessores* or perching birds; whereas they have placed the *Psittacidæ* the *first* in their systems.

The arranging of the parrots with the *Scansores* appears to me highly artificial, and, as it were, forcing them into a place in a system, where they have little except the formation (*zygodactylism*) of the toes, and perhaps the colours in some degree of the plumage, to warrant such a step. If we compare their structure with that of the *Raptores*, we shall

find the parrots approaching most strongly to them. Thus, I will enumerate some of their comparative resemblances.

They have a hooked bill,—termed also “rostrum aduncum” by *Linnaeus*, and a cere covering its base, through which are pierced the nostrils. These are round, like those of many of the falcons and owls. Their tarsi are reticulated; and their claws, resembling talons, are sharp, and much curved. The shape of some parrots is similar to that of a hawk; whilst that of some others with a short tail is thick-set, and rather broad or squat, and resembles the shape of an owl. Again, the naked cheeks or places about the eyes of certain maccaws, represent the plumose discs, which surround the eyes of owls. These nocturnal raptores likewise further approach to the parrots, in having their external toe capable of being turned backwards, which, when reversed, resembles the zygodactyle position of the latter. Also in their internal organization they are in these respects similar, viz., the sternum of parrots is much like that of the falconidæ, while the furcula approximates to that of the owls, by being somewhat flattened. And the œsophagus is equally enlarged with that of the falcons.

So far had I written, before I had seen, or even heard of, that most singular parrot, *Strigops habroptilus*, which has recently* been placed in the British Museum. This parrot, as its generic name implies, is exceedingly like an owl in its general conformation, in having facial discs, and long hair-like feathers about its beak, and in its downy or soft feathers or plumage; from which latter circumstance, the name of *Habroptilus*, has been given to it. It is figured at plate 105, Part XVII., of Gray’s and Mitchell’s “Genera of Birds,” and is classed by them in their subfamily Cacatuinæ, which corresponds with my family *Plyctolophidæ*. This bird, then, fully confirms, in the most unexpected manner, the views I had long entertained of placing the parrot families *between* the owls, and the insessorial birds: so this new genus *Strigops* must stand the first, or *nearest* to the owls, in my *first* family *Plyctolophidæ*.

* Mr J. E. Gray informs me that he purchased this bird at Havre in the last summer, and that it is a native of New Zealand.

But I must observe that notwithstanding these affinities to the raptores, the parrot groups are essentially distinct from both the diurnal and nocturnal subtribes of that order, and therefore compose of themselves an extremely natural order.

The term "Prehensores," or *HOLDERS*, will be found admirably appropriate; because, the parrots, of all birds, most possess the faculty of *catching hold* of every thing; in addition to the powerful *hold* which they always take with their toes and claws,—and these, from their structure, are best adapted to that purpose—they also *hold*, when in the act of climbing, by their strong beak; and, when about to eat, they generally hold their food in one foot, and so raise it to their mouth. Since the bill of the parrots, although hooked, differs materially from that of the raptorial birds, by being *rounder* in all its parts, I have consequently named the tribe *Rotundirostres*. Indeed, in these birds the upper mandible is likewise different in its anatomical structure, for it forms quite a separate bone, and is articulated to the cranium. The *three subtribes*, Lævilingues, Hirtilingues, and Tubilingues, are distinguished by the *tongues* being *smooth*, or *rough*, sometimes even hairy, or *tubular*. I must, however, observe, that a further knowledge of several genera of the rotundirostral tribe is requisite, for the purpose of determining with greater accuracy the groups proposed in this arrangement, as well as, in all probability, of adding other new ones to it. The extra-European or foreign order of *Prehensores*, comprising the Linnæan genus *Psittacus*, I have here introduced, for the sake of completing my *general classification* of birds: *all the rest* of the *foreign* families and genera can be included in my remaining *five* orders.

Order III. *Insessores*. I commence the *perching* birds with the Scansores, or *climbers*, as being most nearly allied to those of the preceding order. Many of their habits are similar; and the division of the toes into two *pairs* or *yokes*, which has been well termed *zygodactyle*, *i. e.*, two fore-toes and two hind-toes, is very much the same. In the arrangement I have here proposed, the approximation of the genera in each succeeding order to those in the one immediately pre-

ceding it, will be distinctly apparent. In the Raptores, as I have before said, the diurnal rapacious birds are connected with the nocturnal by the genera *Strigiceps* (the *owl-harrier*) and *Surnia* (*funerea* or *hawk-owl*); again, the *Prehensores* are approximated to the latter by *Strigops*, or the *owl-parrot*; and the *Insessores* are directly allied to the *Prehensores* by the scansorial genera (amongst others) *Oxylophus*, which in some respects exhibits an affinity to *Plyctolophus*, and *Picus*, which bears no great dissimilarity of plumage from certain of the *parrots* (*Psittacus*). Lastly, the more ordinary division of the toes of the true *Insessores* is then approached through *Sitta*, and other genera of the *Scansores* that are furnished with three toes before and one behind.

My *first* tribe, *Curvirostres*, is derived from the somewhat slender and generally *curved* beak of the cuckoos; whilst my *second* tribe *Cuneirostres*, is founded on the strong *cuneated* or wedge-shaped beak of the woodpeckers, wryneck, nut-hatch, &c.

Of this tribe the family 2, *Apternidæ*, is constituted for the reception of the *three-toed* woodpeckers. The genus *Apternus* of Swainson is its type, and is correctly named, for the word signifies *without* a *hind-toe*, or *heel*; consequently, this family forms a very rare *exception* to the groups comprised in this subclass, and to which I would also refer the foreign species *Picus shorii* and *P. tiga*. Although the hind-toe itself is absent in these birds, yet the outer fore-toe being placed behind, and in the same plane with the others, causes the want of it to be scarcely felt in the functions of walking and climbing.

Family 3, *Sittidæ*. I think there is much anomaly in placing, as the English ornithologists do, three genera with such different beaks as the *wren*, the *hoopoe*, and the *nut-hatch*, in the *same* family, *Certhiadæ*, and in the *same* tribe, *Scansores*; whilst, in fact, the *hoopoe* cannot be called a *climber*. *Cuvier's* System places that genus, and the *nut-hatch*, among the *Tenuirostres*, but the *wren* among the *Dentirostres*; to this, likewise, there are several objections. Since the genus *Sitta* differs in its structure from those genera, as well as from the two preceding families, I have, in

order to assign it a station more consistent with nature, placed it in a separate family in my Cuneirostral tribe.

Subtribe 2, *Clamatores*, Criers or Screamers, I have limited to only a few groups; one of which, the Coraciadidæ, or the European *Roller* family, I prefer placing in the Conirostral tribe, and next to the jays, which in many respects it resembles, rather than among the Fissirostres, as some of our modern naturalists do. Although the wide gape, with which the *common roller* is furnished, may give it a claim to that place; still I am inclined to divide the present family *Coraciadidæ*, and station the Australian and African kinds, especially those of the latter, which are *long-tailed*, and strongly approach the *bee-eaters* in form and appearance, next after the family Meropidæ, among the Fissirostres. And this division would then constitute a new family, and stand in my subtribe *Allodactyli*, and just before the Hirundinidæ. I have observed the *common roller* in Sicily, and think it clearly more allied to the Corvidæ than to any other group. Like the *jay*, it is restless, makes a loud chattering cry, and seeks its food upon the ground, which consists of insects, caterpillars, worms, &c. But it even resembles the *woodpeckers* in breeding in decayed trees, and having eggs of a beautiful shining white colour. In fact, the eggs of the *roller* in their shape more exactly correspond with those of *Picus minor*.

Family 2: *Corvidæ*. It will be remembered that *Cuvier* classes the genus *Fregilus*, with the hoopoe, amongst his Tenuirostres, which is perhaps its proper place, if we regard the beak alone. To place it in the Conirostral tribe seems incorrect; but its general appearance and habits must decide its station to be with the Corvidæ. *Fregilus* is, consequently, an aberrant genus.

The *third* subtribe, or *Cantatores*, Singers, is very extensive, comprising, in strictness, all the *singing* birds, and especially the true *Warblers*.

Family 4. *Loxiadæ*. Considering that the family of *Fringillidæ*, as usually retained, is much too comprehensive, and ought to be divided into one or two more, I have adopted, for the larger and thicker billed genera *Loxia*, *Pyrrhula*, *Cocco-*

thraustes. &c., *Vigors'* family of *Loxiadæ*. (See *Zool. Journ.*, vol. ii., p. 399.)

Family *Aëdonidæ*. Instead of the name *Sylviadæ*, which has been given to the group of true *Songsters* or *Warblers*, I have bestowed that of *Aëdonidæ*, from the Greek *ἀῶδων*, a *nightingale*, which is derived from the verb *ἀείδω*, to *sing*. The word for this family will itself appropriately signify *songsters*, being also received from that chief of songsters the *nightingale*, as its type. Consequently, it appears to me to be better to assign the generic appellation of *Aëdon* to that bird, than to continue that of *Philomela*. So, then, our two European *nightingales* would be called *Aëdon Philomela* and *Aëdon Luscinia*.

Subtribe 4, *Latrones*, Robbers, are the *birds of prey* of the *Insessorial* order, or *Perchers*. They include the *Butcher-birds*, *Shrikes*, and *Fly-catchers*.

Subtribe 5. *Anisodactyli*. This and the two following subtribes, *Syndactyli* and *Allodactyli*, are distinguished by their *toes*.

Family 2. *Upupidæ*. As the *hoopoe* must clearly be placed in a distinct family, I have employed that previously formed by the Prince of *Canino*. But the same author having instituted the family *Cypselidæ* for the *Swifts*, and so entirely divided them from the *Hirundinidæ*, I can by no means agree with him in the necessity for this.

Tribe VII. *Cutinarirostres*, I have thus designated because of the tumid and soft skin, or *cuticle*, at the base of the bill, in which the *nostrils* are situated, being peculiar to the *pigeons*, *doves*, and *turtles*.

The title of *Gyratores*, bestowed upon the *Columbidæ* by *C. L. Bonaparte*, is strongly indicative of their movements.

Here I must remark, that those zoologists who class the *Columbidæ* with the *Rasores*, or *Gallinaceous* birds, evidently transgress the order of nature. No doubt, these birds approximate nearest to the latter in some respects, yet in others, and those the most important, they are totally dissimilar.

They resemble the *Rasores*, and especially the domestic poultry, in their young being hatched with much hairy down

upon them, and not naked,—in some species having caruncles, narrow and long feathers on their necks,—and in several of their habits.

But they differ from them (amongst other things) in their young being mostly born blind, tender, and requiring to be fed for some time,—in being monogamous, chiefly arboreal, possessing constrictile feet, fully suited for perching; with the hind-toe quite resting on the ground; the tarsi unarmed with spurs, and in general not swift-footed.

Subclass II. Aves Inconstrictipedes, birds with *inconstrictile feet*; i. e., *feet little or not adapted to grasping*.

The birds in this *subclass* make either a poor and rude nest, in which they lay their eggs, or else none, depositing them on the bare ground. The young are generally born with their full sight, covered with down, strong, and capable of running or swimming immediately after they leave the egg-shell. The parent birds attend, and direct them where to find their food. They are mostly polygamous, have the feet little or not adapted to grasping, and very frequently want the thumb or hind-toe; but this, when present, is chiefly placed higher up the tarsus than the plane of the fore-toes, and usually rests, in a slight degree, or not at all, upon the ground.

The tribe *Convexirostres* points out the strongly *arched*, or *convex bill*, of the Gallinæ, gallinaceous birds or scratchers (*Rasores*); and this I have divided into *two subtribes*;—the first *Podarcees*, Ποδάργεες, able with their feet, or *swift-footed*,—the usual characteristic of this active group, consisting chiefly of game-birds and poultry; and the second, *Podenemi*—Ποδήνεμοι, having *feet as swift as the winds*. This subtribe comprehends the bustards, which depend upon the swiftness of their powerful, long, and muscular *legs*, for safety, rather than upon the use of their short wings.

The genus *Hemipodius*, or *half a foot*, is so named, because it wants the hind-toe; and in this respect, as well in being polygamous, as in having the bill compressed, it approaches to the bustard. Consequently, I have stationed it in a separate family, *Hemipodiadæ*, and next before that of *Otididæ*.

The *stilts* or *waders* (*Grallatores*) constitute the Order V.,

of which my *first* subtribe marks the *courasers* or *running waders*.

The birds in this order possess almost every variety of feet, which are furnished with either *three* or *four* toes. The hind-toe or *thumb*, when it exists, is generally placed at a varying height upon the tarsus, and does not at all touch the ground, or only does so in a slight degree; rarely, however, it is attached in the same plane with the fore-toes, and rests altogether on the ground, or presses in a great degree upon it. The mode in which the fore-toes are divided, is likewise variable, and the modifications of the web or membrane are numerous, and in some examples exceedingly remarkable.

The beaks also greatly vary, but for the most part they are of considerable length, and well adapted to searching in water or wet places, for food; so are the legs, and frequently, too, the necks of the different groups.

Family 3, *Hæmatopodidæ*, is established for the reception of that singular genus *Hæmatopus*, which is of importance, as it leads directly to the following:—

Tribe II. *Cultrirostres*, signifying the *knife-bills*, an appellation very appropriately bestowed on the group by *Cuvier*. In fact, the bill of these birds, and especially of the *Ardeidæ*, is a most dangerous weapon; when used as an instrument of defence, they suddenly dart it into their enemy like a long knife or *stilétto*.

My *second* subtribe, *Ambulatores*, distinguishes the *stilts* or *Walking-waders*; this ought to be again divided into two or three sections, such as *Tardi*, *Veloces*, &c.

Tribe III. *Pyxidirostres*, *i. e.*, *box-billed*, I have taken for the family *Phœnicopteridæ*, from M. *Edm. de Selys-Longchamps'* Classification of Birds, published in his "Faune Belge," *Liège*, 1842.

Tribe IV. Since the *Spoonbills* cannot be correctly classed with the *dagger* or *knife-billed* birds, *Cultrirostres*, I have been compelled to form a new tribe for them, and which I have termed *Spathulirostres*, the *Spatula-billed* group. So I have necessarily added another family, *Plataleidæ*. In this and several more *new* families, I observe, on a very recent

perusal of *M. De Selys-Longchamps'* work, that he has anticipated me in their institution. It is, however, gratifying to me to find, that so able a naturalist coincides in the necessity for these *new* groups.

Family 2. *Recurvirostridæ*. Agreeing with *C. L. Bonaparte*, I have placed the remarkable genus *Recurvirostra* in a separate family; but among *Cuvier's* Longirostres, or *Long-billed* group, which I have taken for my *fifth* tribe of Grallatores.

Family 5. *Phalaropodidæ*. On more mature consideration I prefer to follow *C. L. Bonaparte* in the name of this family. I had previously arranged it under the title of *Lobipedidæ*, as Mr *Yarrell* has done; but, since the genera *Phalaropus* and *Lobipes* belong, without any doubt, to the *Longirostral* tribe, and bear a close affinity to the genus *Tringa*, I have here necessarily assigned to them their true and natural position.

Tribe VI. *Diversirostres*. The great *diversity*, as well in the *shape*, as in the *length* and *size* of the beaks of the rails and crakes, that form the present very natural tribe, has obliged me, for the sake of perfecting this *Rostral* classification, to entitle it *Diversirostres*.

The *Rallidæ*, as well as the *Fulicidæ*, are furnished with *long toes*, unconnected by any membrane at their base, the *Macroductyli* of *Cuvier*, which (although not webbed) are in some species edged with lateral membranes, that greatly assist in swimming.

Tribe VII. *Frontiscutirostres*. The singular naked *shield*, disc, or plate, upon the *forehead* of the Gallinules, Sultanas, and Coots, of the same consistency or nature as the *beak* itself, has led me to establish this tribe. Indeed, this *frontal shield* seems only to be a *portion of the beak* carried over the forehead, about as high as the crown of the head. The lobed-feet of the *Coots*, together with their habits, form, and plumage, mark them as most nearly allied to the true *web-footed* birds, *Natatores* or *Swimmers*, which compose my last and

VI. Order. The *feet* of the several tribes in this order are more *simple* than those of the preceding. They are all

webbed, *palmipedes*, but chiefly present *three* forms of *palmature*; *first*, where the fore-toes are alone connected by a membrane: this is the *common palmature*; *secondly*, the *totipalmature*, where the hind-toe is placed at the inner side of the tarsus, and united with the fore-toes in one entire web; and, *thirdly*, where the fore-toes are edged with lateral and extended membranes: this is called the *fissopalmature*. The *tarsi* are more or less compressed, and the *claws* in some are short and blunt, whilst in others they are flat and square, or curved and sharp, resembling talons.

Tribe I. *Lamellirostres*. Cuvier has thus very properly named his fourth family of *Palmipedes*, which, with the exclusion of the genera *Mergus* and *Merganser* (also *Membranipollices*), I have assumed for my *first* tribe of the *Natatores*. In truth, the *lamellæ* or denticulations, present one of the principal characters in defining the genera of the *Anatidæ*. I have divided it into two subtribes, *Simplicipollices* and *Membranipollices*; and I have separated the geese and swans (*Anseridæ*) from the ducks, whilst the latter, with the remainder of the *Lamellirostral* tribe, being the Pochards, Scoters, Eiders, &c. I have divided into two more families, by restricting those genera, chiefly fluviatile and lacustrine, which have the thumb or *hind-toe simple*, or *without* a membrane, to the family *Anatidæ*; and by placing the rest possessing the *hind-toe edged with a membrane*, in the family *Fuligulidæ*, being the marine or oceanic kinds.

Family 1. *Anseridæ*. I have thought myself warranted in classing the geese and swans apart from the large family of *Anatidæ* of the English zoologists; because, in addition to their shape, and some other characters, their tracheæ are mostly *not* furnished with any enlargement or labyrinth, or rarely with a *single* one, as in the Egyptian goose; while the remaining male *Anatidæ*, except the common scoter, possess osseous, or cartilaginous, labyrinths, at the extremities of their tracheæ. Also, I consider that the domestic swan ought to constitute a separate genus, which might be called *Olor*, and the species *Mutus*; but the *Hooper*, with the other species, should be stationed in the restricted genus *Cygnus*, for they differ, besides some minor points, in these structural

ones of importance; namely, in the absence of the basal protuberance of their bill, and in the lengthened tube of their windpipe, which enters with a fold into a cavity, within the keel of the sternum. And in the distribution of the *Anseridæ* I have arranged the genera thus:—1. *Bernicla*, beginning with (*B. Brenta*) the brent bernicle, which affords considerable resemblance to the common coot, the last of the Grallatorial order, both in shape, colour, and plumage. 2. *Anser*; 3. *Chen*; 4. *Cygnus*; 5. *Olor*; and then I have placed the spur-winged goose (*Plectropterus Gambensis*), because, in that bird, the single enlargement at the end of the trachea first presents itself, and is perforated with many holes, thereby approaching to the *Anatidæ*. And, lastly, I have added the *Chenalopez Egyptiaca*, or Egyptian goose; for that species next offers the tracheal enlargement, which is larger and more perfect than the preceding, and thus shews its closer affinity to the family of ducks.

My restricted family 2. *Anatidæ*, answers to *Cuvier's second* division of ducks, which is thus ably defined by that author:—“Les Canards de la *deuxième* division, dont le pouce *n'est point bordé* d'une membrane, ont la tête plus mince, les pieds moins larges, le cou plus long, le bec plus égal, le corps moins épais; ils marchent mieux; recherchent les plantes aquatiques et leurs graines, autant que les poissons et autres animaux. Il paraît que les renflemens de leurs trachées sont de substance homogène, osseuse et cartilagineuse.” (*Règne Animal*, p. 536, tome i., edit. 1817.)

Family 3, *Fuligulidæ*, constitutes the *first* division of *Cuvier's* arrangement of the ducks (*Les Canards*), and is characterized by him as follows:—“Les espèces de la *première* division, ou celles dont le pouce *est bordé* d'une membrane, ont la tête plus grosse, le cou plus court, les pieds plus en arrière, les ailes plus petites, la queue plus roide, les tarses plus comprimés, les doigts plus longs, les palmures plus entières. Elles marchent plus mal, vivent plus exclusivement de poissons, et d'insectes, et plongent plus souvent.” (*Reg. An.*, p. 532, tome i.)

Notwithstanding that the tracheal tube and labyrinth of the golden Eye (*Clangula*), approximating to those of the

Mergidæ, would direct me to station it the last in this group, as Mr Yarrell has done, I have arranged it *first*, since its size, form, and appearance, clearly indicate its place to be next to the Wigeon (*Mareca*.)

Tribe II. *Serrirostres*. I considered it more correct to institute this tribe of *saw-billed* Natatores, for the *Mergidæ*, *Carbonidæ*, &c., because the mandibles of their bills are armed with sharp *teeth* like those of a *saw*, indeed, very different from the *Lamellæ* of the former tribe, than to continue them, as in the *Cuvierian* classification, among the *Lamellirostres*. Still I ought to remark, that some authors designate the mandibles of the Trogons and Pteroglossi as *serrated*, but these are more strictly *cut in*, or jagged, along their exterior margins; and they would, therefore, be better defined by the term *Incisirostres*. Further, relying on two or three distinctions, I have deemed it expedient to raise the genera *Mergus* and *Merganser* to the dignity of a family, of which the former is its type.

Subtribe 3. *Totipalmæ*, the *entire webs* of Baron Cuvier. Here we find the hind-toe, or thumb, brought forward, or rather to the inner side of the foot, and connected with the three fore-toes by a strong and *total web*.

Family 2. *Fregatidæ*. I have retained *Ray's* generic title of *Fregata* for the man-of-war bird, and have placed it in a family separated from the *Carbonidæ*; because the feet of that singular bird, although having the hind-toe brought to the side, and united with a single palmature, differ much, in the toes being only webbed for about one-third of their length, and not, as in the two following families, as far as the claws. These last, resembling the talons of the Raptores, are sharp and strongly curved. The *Fregata* is an American species; and its appearance in Europe has been accidental. The Prince of *Canino* says, it was only *once* seen at the mouth of the *Weser* in January 1772.

Family 3. *Carbonidæ*, or the Cormorants, have been necessarily divided by myself from the *Pelecanidæ* of authors for several important reasons; among which is the *absence* of all *serrated* denticulations on the edges of the mandibles of the latter. So likewise, the remarkable form of the entire bill,

and the shape and character of the pelicans being more allied to those of the swans, have confirmed such a division.

Tribe III., *Sacculirostres* is so named from the peculiar bag, or *small sack*, affixed to the lower mandible of the *Pelicanidæ*. In fact, the *pelican* is one of the most extraordinary of the European water birds, and, like the Flamingo or Avocet, ought to constitute, *per se*, a distinct family.

Tribe IV. *Tubinarirostres*. This tribe I have derived from *M. Illiger's* "Tubinares," on account of the *tubular nostrils*, which extend along the top of the upper mandible of the different genera in this group. This, and the two following tribes, are furnished with *long wings*; and they are included in *Cuvier's* "Longipennes," or *second* family of *Pal-mipedes*.

Family *Procellariadæ*. As *C. L. Bonaparte* had previously done, so I have separated the Petrels, &c. from the *Laridæ*, and restricted to them the present family.

Tribe V. *Medionarirostres*. The *nostrils* in the skuas, gulls, and xemes, are placed about the *middle* of their *bill*; hence the term, which I have assigned to this tribe, will convey to it a proper signification.

Family *Laridæ*. From the similitude of the bill of the genus *Cataracta*, or Cascade skua, to that of *Procellariadæ*, I have selected for it the first station in this family.

Tribe VI. *Subulirostres*. This is a very natural tribe taken from the *subulate*, or awl-shaped beaks of the terns and sea swallows.

Family *Sternidæ*. I have differed from *C. L. Bonaparte*, *M. de Selys-Longchamps*, and others, in forming a new family *Sternidæ*, quite independent of the *Laridæ*. Also, the genus *Pontochelidon* has been instituted by me for the reception of *Sterna Caspia*, and *S. Anglica*.

Tribe VII. I have designated *Cuspidirostres*, because of the strong sharp-pointed beaks of the several genera, which much resemble the *point of a spear*. They all have *short wings*—the "Brachyptera" of *Cuvier*;—but which, for the sake of uniformity of expression adopted for my last three *subtribes*, I have called *Brevipennes*, as I find *M. de Selys-Longchamps* has likewise done.

Family 1. *Podicipidæ*. From the remarkable feet of the grebes, their want of a tail, and some other characters, I perfectly coincide with the last mentioned author in separating them from the family of *Colymbidæ*.

Tribe VIII. *Sulcirostris*. I have bestowed this title upon the present tribe, in order to point out their peculiar *bills* as well as the grooves or *furrows* (*sulci*) that are apparent in them.

Family I. *Mormonidæ*. This family has been established by myself for the little auk, puffin, razor-bill, &c., since they principally differ from the true auks (*Alcidæ*) in their short, but more perfectly developed wings, with which they are able to fly, notwithstanding the statement of *Cuvier* and others to the contrary.

Obs. With respect to the *subtribes*, I must here make some explanation, viz., that where *one* subtribe is intended to embrace *more* families than those comprised in a *single* tribe, for example, the *subtribe* Longipennes may include the Laridæ and Sternidæ, as well as the Procellariadæ; and the *subtribe* Brevipennes, the Podicipidæ, Colymbidæ, and Mormonidæ, the term *suborder* might perhaps be more correctly substituted for that of *subtribe*, and in lieu of standing *after* be placed *before*, the tribe; but this I will leave to the judgment of others. And I will only add, that I have preferred, for the sake of a uniform terminology, to name *all* those sections *subtribes*, and not *some* of them "suborders," and *others* "subtribes."

Subtribe 6. *Imperfectipennes*, in consequence of the *wings* of the true auks (*Alcidæ*) being so *imperfect*, as to be useless for the purpose of flying, I have formed this subtribe for them, and for the foreign family of Penguins (*Spheniscidæ*), which is furnished with very similar wings.

Family 2. *Alcidæ*. Herein are contained the restricted auks; and I thus station the wingless auk (*Alca impennis*) the *last* in my arrangement of the *European* birds.

As I have previously mentioned, that I would begin my *general* classification of birds by the *condor* (*Sarcoramphus gryphus*), and I would terminate it by the smallest species of *penguin*; so, in like manner, it will be seen, that I have com-

menced my distribution of the *birds of Europe* by the genus *Neophron*, a bird endued with great *vigor of flight*, and have concluded it by the *flightless Auk*. It will also be observed, how I have placed the subtribe *Brevipennes* intermediately between the *Longipennes* on the one side, and the *Imperfectipennes* on the other, and thus gradually leading from the web-footed birds, possessing considerable power and swiftness of wing, to those which have almost *no wings*, or at least are entirely deprived of the faculty of flying. For, in reality, the wings of the latter are *most imperfectly* developed; being merely rudimentary, with scale-like feathers, and useless as instruments of flight, they are alone serviceable as *fins* for the functions of swimming and diving. Thus we find the birds comprised in my last family, *Spheniscidæ*, or the Penguins, in their form, habits, and marine mode of life, approximating most closely to the Turtles, or *Amphibia*, and to the following class of Fishes.

Lastly, in the preceding classification, the great *increase* in the *number of families* may, at first sight, appear objectionable to some ornithologists. But, on a further examination of it, I trust, their objections will be removed; because I feel satisfied, that, by a more minute and extended division of the birds into such groups, we arrive at a more perfect and natural arrangement: and, at the same time, I consider it to be the only accurate method of attaining to a full knowledge of the differences presented in their organization. And I am exceedingly gratified to find, that the view of that most distinguished philosopher and observer of nature, *Alexander von Humboldt*, precisely agrees with my own; for, in his work "*Cosmos*," now publishing (vol. i., p. 388), he thus writes: "In the natural history of *birds* and fishes, the system of grouping into *many small families* is more *certain* than that into a few divisions, embracing larger masses."
